CW

ENTERED

PCT10

RAW SEQUENCE LISTING DATE: 02/20/2003
PATENT APPLICATION: **US/10/019,644** TIME: 15:28:10

Input Set : **A:\SEQLIST(5854-6).TXT**
Output Set: **N:\CRF4\02202003\J019644.raw**

```
 4 <110> APPLICANT: Kappes, John
 5       Wu, Xiaoyun
 6       Wakefield, John
 9 <120> TITLE OF INVENTION: Retroviral Recombination Assays and Uses
10       Thereof
12 <130> FILE REFERENCE: 44276/242574 (5854-6)
C--> 14 <140> CURRENT APPLICATION NUMBER: US/10/019,644
C--> 15 <141> CURRENT FILING DATE: 2002-05-28
17 <150> PRIOR APPLICATION NUMBER: 60/143,015
18 <151> PRIOR FILING DATE: 1999-07-09
20 <150> PRIOR APPLICATION NUMBER: 60/164,626
21 <151> PRIOR FILING DATE: 1999-11-10
23 <160> NUMBER OF SEQ ID NOS: 6
25 <170> SOFTWARE: FastSEQ for Windows Version 4.0
27 <210> SEQ ID NO: 1
28 <211> LENGTH: 9181
29 <212> TYPE: DNA
30 <213> ORGANISM: Human immunodeficiency virus
32 <220> FEATURE:
33 <221> NAME/KEY: misc_feature
34 <222> LOCATION: (0)...(0)
35 <223> OTHER INFORMATION: HIV-1 genome (GenBank Accession No. AF033819)
37 <400> SEQUENCE: 1
38 ggtctctctg gttagaccag atctgagcct gggagctctc tggctaacta gggaacccac 60
39 tgcttaagcc tcaataaagc ttgccttgag tgcttcaagt agtgtgtgcc cgtctgttgt 120
40 gtgactctgg taactagaga tccctcagac ccttttagtc agtgtggaaa atctctagca 180
41 gtggcgcccg aacagggacc tgaaagcgaa agggaaacca gaggagctct ctcgacgcag 240
42 gactcggctt gctgaagcgc gcacggcaag aggcgagggg cggcgactgg tgagtacgcc 300
43 aaaaattttg actagcggag gctagaagga gagagatggg tgcgagagcg tcagtattaa 360
44 gcgggggaga attagatcga tgggaaaaaa ttcggttaag gccaggggga aagaaaaaat 420
45 ataaattaaa acatatagta tgggcaagca gggagctaga acgattcgca gttaatcctg 480
46 gcctgttaga aacatcagaa ggctgtagac aaatactggg acagctacaa ccatcccttc 540
47 agacaggatc agaagaactt agatcattat ataatacagt agcaaccctc tattgtgtgc 600
48 atcaaaggat agagataaaa gacaccaagg aagctttaga caagatagag gaagagcaaa 660
49 acaaaagtaa gaaaaaagca cagcaagcag cagctgacac aggacacagc aatcaggtca 720
50 gccaaaatta ccctatagtg cagaacatcc aggggcaaat ggtacatcag gccatatcac 780
51 ctagaacttt aaatgcatgg gtaaaagtag tagaagagaa ggctttcagc ccagaagtga 840
52 tacccatgtt ttcagcatta tcagaaggag ccaccccaca agatttaaac accatgctaa 900
53 acacagtggg gggacatcaa gcagccatgc aaatgttaaa agagaccatc aatgaggaag 960
54 ctgcagaatg ggatagagtg catccagtgc atgcagggcc tattgcacca ggccagatga 1020
55 gagaaccaag gggaagtgac atagcaggaa ctactagtac ccttcaggaa caaataggat 1080
56 ggatgacaaa taatccacct atcccagtag gagaaattta taaaagatgg ataatcctgg 1140
57 gattaaataa aatagtaaga atgtatagcc ctaccagcat tctggacata agacaaggac 1200
```

RAW SEQUENCE LISTING DATE: 02/20/2003
PATENT APPLICATION: **US/10/019,644** TIME: 15:28:10

Input Set : **A:\SEQLIST(5854-6).TXT**
Output Set: **N:\CRF4\02202003\J019644.raw**

58 caaaggaacc ctttagagac tatgtagacc ggttctataa aactctaaga gccgagcaag 1260
59 cttcacagga ggtaaaaaat tggatgacag aaaccttgtt ggtccaaaat gcgaacccag 1320
60 attgtaagac tattttaaaa gcattgggac cagcggctac actagaagaa atgatgacag 1380
61 catgtcaggg agtaggagga cccggccata aggcaagagt tttggctgaa gcaatgagcc 1440
62 aagtaacaaa ttcagctacc ataatgatgc agagaggcaa ttttaggaac caaagaaaga 1500
63 ttgttaagtg tttcaattgt ggcaaagaag ggcacacagc cagaaattgc agggccccta 1560
64 ggaaaaaggg ctgttggaaa tgtggaaagg aaggacacca aatgaaagat tgtactgaga 1620
65 gacaggctaa ttttttaggg aagatctggc cttcctacaa gggaaggcca gggaatttc 1680
66 ttcagagcag accagagcca acagccccac cagaagagag cttcaggtct ggggtagaga 1740
67 caacaactcc ccctcagaag caggagccga tagacaagga actgtatcct ttaacttccc 1800
68 tcaggtcact ctttggcaac gacccctcgt cacaataaag atagggggc aactaaagga 1860
69 agctctatta gatacaggag cagatgatac agtattagaa gaaatgagtt tgccaggaag 1920
70 atggaaacca aaaatgatag ggggaattgg aggttttatc aaagtaagac agtatgatca 1980
71 gatactcata gaaatctgtg gacataaagc tataggtaca gtattagtag gacctacacc 2040
72 tgtcaacata attggaagaa atctgttgac tcagattggt tgcactttaa attttccccat 2100
73 tagccctatt gagactgtac cagtaaaatt aaagccagga atggatggcc caaaagttaa 2160
74 acaatggcca ttgacagaag aaaaaataaa agcattagta gaaatttgta cagagatgga 2220
75 aaaggaaggg aaaatttcaa aaattgggcc tgaaaatcca tacaatactc cagtatttgc 2280
76 cataaagaaa aaagacagta ctaaatggag aaaattagta gatttcagag aacttaataa 2340
77 gagaactcaa gacttctggg aagttcaatt aggaatacca catcccgcag ggttaaaaaa 2400
78 gaaaaaatca gtaacagtac tggatgtggg tgatgcatat ttttcagttc ccttagatga 2460
79 agacttcagg aagtatactg catttaccat acctagtata aacaatgaga caccagggat 2520
80 tagatatcag tacaatgtgc ttccacaggg atggaaagga tcaccagcaa tattccaaag 2580
81 tagcatgaca aaaatcttag agccttttag aaaacaaaat ccagacatag ttatctatca 2640
82 atacatggat gatttgtatg taggatctga cttagaaata gggcagcata gaacaaaaat 2700
83 agaggagctg agacaacatc tgttgaggtg gggacttacc acaccagaca aaaaacatca 2760
84 gaaagaacct ccattccttt ggatgggtta tgaactccat cctgataaat ggacagtaca 2820
85 gcctatagtg ctgccagaaa aagacagctg gactgtcaat gacatacaga agttagtggg 2880
86 gaaattgaat tgggcaagtc agatttaccc agggattaaa gtaaggcaat tatgtaaact 2940
87 ccttagagga accaaagcac taacagaagt aataccacta acagaagaag cagagctaga 3000
88 actggcagaa aacagagaga ttctaaaaga accagtacat ggagtgtatt atgacccatc 3060
89 aaaagactta atagcagaaa tacagaagca ggggcaaggc caatggacat atcaaattta 3120
90 tcaagagcca tttaaaaatc tgaaaacagg aaaatatgca agaatgaggg gtgcccacac 3180
91 taatgatgta aaacaattaa cagaggcagt gcaaaaaata accacagaaa gcatagtaat 3240
92 atggggaaag actcctaaat ttaaactgcc catacaaaag gaaacatggg aaacatggtg 3300
93 gacagagtat tggcaagcca cctggattcc tgagtgggag tttgttaata cccctccctt 3360
94 agtgaaatta tggtaccagt tagagaaaga acccatagta ggagcagaaa ccttctatgt 3420
95 agatggggca gctaacaggg agactaaatt aggaaaagca ggatatgtta ctaatagagg 3480
96 aagacaaaaa gttgtcaccc taactgacac aacaaatcag aagactgagt tacaagcaat 3540
97 ttatctagct ttgcaggatt cgggattaga agtaaacata gtaacagact cacaatatgc 3600
98 attaggaatc attcaagcac aaccagatca aagtgaatca gagttagtca atcaaataat 3660
99 agagcagtta ataaaaaagg aaaaggtcta tctggcatgg gtaccagcac acaaaggaat 3720
100 tggaggaaat gaacaagtag ataaattagt cagtgctgga atcaggaaag tactattttt 3780
101 agatggaata gataaggccc aagatgaaca tgagaaatat cacagtaatt ggagagcaat 3840
102 ggctagtgat tttaacctgc cacctgtagt agcaaaagaa atagtagcca gctgtgataa 3900
103 atgtcagcta aaaggagaag ccatgcatgg acaagtagac tgtagtccag gaatatggca 3960
104 actagattgt acacatttag aaggaaaagt tatcctggta gcagttcatg tagccagtgg 4020
105 atatatagaa gcagaagtta ttccagcaga aacagggcag gaaacagcat attttctttt 4080
106 aaaattagca ggaagatggc cagtaaaaac aatacatact gacaatggca gcaatttcac 4140

RAW SEQUENCE LISTING DATE: 02/20/2003
PATENT APPLICATION: US/10/019,644 TIME: 15:28:10

Input Set : A:\SEQLIST(5854-6).TXT
Output Set: N:\CRF4\02202003\J019644.raw

```
107 cggtgctacg gttagggccg cctgttggtg ggcgggaatc aagcaggaat ttggaattcc 4200
108 ctacaatccc caaagtcaag gagtagtaga atctatgaat aaagaattaa agaaaattat 4260
109 aggacaggta agagatcagg ctgaacatct taagacagca gtacaaatgg cagtattcat 4320
110 ccacaatttt aaaagaaaag gggggattgg ggggtacagt gcaggggaaa gaatagtaga 4380
111 cataatagca acagacatac aaactaaaga attacaaaaa caaattacaa aaattcaaaa 4440
112 ttttcgggtt tattacaggg acagcagaaa tccactttgg aaaggaccag caaagctcct 4500
113 ctggaaaggt gaaggggcag tagtaataca agataatagt gacataaaag tagtgccaag 4560
114 aagaaaagca aagatcatta gggattatgg aaaacagatg gcaggtgatg attgtgtggc 4620
115 aagtagacag gatgaggatt agaacatgga aaagtttagt aaaacaccat atgtatgttt 4680
116 cagggaaagc taggggatgg ttttatagac atcactatga aagccctcat ccaagaataa 4740
117 gttcagaagt acacatccca ctaggggatg ctagattggt aataacaaca tattggggtc 4800
118 tgcatacagg agaaagagac tggcatttgg gtcagggagt ctccatagaa tggaggaaaa 4860
119 agagatatag cacacaagta gaccctgaac tagcagacca actaattcat ctgtattact 4920
120 ttgactgttt ttcagactct gctataagaa aggccttatt aggacacata gttagcccta 4980
121 ggtgtgaata tcaagcagga cataacaagg taggatctct acaatacttg gcactagcag 5040
122 cattaataac accaaaaaag ataaagccac ctttgcctag tgttacgaaa ctgacagagg 5100
123 atagatggaa caagccccag aagaccaagg gccacagagg gagccacaca atgaatggac 5160
124 actagagctt ttagaggagc ttaagaatga agctgttaga cattttccta ggatttggct 5220
125 ccatggctta gggcaacata tctatgaaac ttatggggat acttgggcag gagtggaagc 5280
126 cataataaga attctgcaac aactgctgtt tatccatttt cagaattggg tgtcgacata 5340
127 gcagaatagg cgttactcga cagaggagag caagaaatgg agccagtaga tcctagacta 5400
128 gagccctgga agcatccagg aagtcagcct aaaactgctt gtaccaattg ctattgtaaa 5460
129 aagtgttgct ttcattgcca agtttgtttc ataacaaaag ccttaggcat ctcctatggc 5520
130 aggaagaagc ggagacagcg acgaagagct catcagaaca gtcagactca tcaagcttct 5580
131 ctatcaaagc agtaagtagt acatgtaatg caacctatac caatagtagc aatagtagca 5640
132 ttagtagtag caataataat agcaatagtt gtgtggtcca tagtaatcat agaatatagg 5700
133 aaaatattaa gacaaagaaa aatagacagg ttaattgata gactaataga aagagcagaa 5760
134 gacagtggca atgagagtga aggagaaata tcagcacttg tggagatggg ggtggagatg 5820
135 gggcaccatg ctccttggga tgttgatgat ctgtagtgct acagaaaaat tgtgggtcac 5880
136 agtctattat ggggtacctg tgtggaagga agcaaccacc actctatttt gtgcatcaga 5940
137 tgctaaagca tatgatacag aggtacataa tgtttgggcc acacatgcct gtgtacccac 6000
138 agaccccaac ccacaagaag tagtattggt aaatgtgaca gaaaatttta acatgtggaa 6060
139 aaatgacatg gtagaacaga tgcatgagga tataatcagt ttatgggatc aaagcctaaa 6120
140 gccatgtgta aaattaaccc cactctgtgt tagtttaaag tgcactgatt tgaagaatga 6180
141 tactaatacc aatagtagta gcgggagaat gataatggag aaaggagaga taaaaaactg 6240
142 ctctttcaat atcagcacaa gcataagagg taaggtgcag aaagaatatg catttttta 6300
143 taaacttgat ataataccaa tagataatga tactaccagc tataagttga caagttgtaa 6360
144 cacctcagtc attacacagg cctgtccaaa ggtatccttt gagccaattc ccatacatta 6420
145 ttgtgccccg gctggttttg cgattctaaa atgtaataat aagacgttca atggaacagg 6480
146 accatgtaca aatgtcagca cagtacaatg tacacatgga attaggccag tagtatcaac 6540
147 tcaactgctg ttaaatggca gtctagcaga agaagaggta gtaattagat ctgtcaattt 6600
148 cacggacaat gctaaaacca taatagtaca gctgaacaca tctgtagaaa ttaattgtac 6660
149 aagacccaac aacaatacaa gaaaaagaat ccgtatccag agaggaccag ggagagcatt 6720
150 tgttacaata ggaaaaatag gaaatatgag acaagcacat tgtaacatta gtagagcaaa 6780
151 atggaataac actttaaaac agatagctag caaattaaga gaacaatttg gaaataataa 6840
152 aacaataatc tttaagcaat cctcaggagg ggacccagaa attgtaacgc acagttttaa 6900
153 ttgtggaggg gaatttttct actgtaattc aacacaactg tttaatagta cttggtttaa 6960
154 tagtacttgg agtactgaag ggtcaaataa cactgaagga agtgacacaa tcaccctccc 7020
155 atgcagaata aaacaaatta taaacatgtg gcagaaagta ggaaaagcaa tgtatgcccc 7080
```

RAW SEQUENCE LISTING DATE: 02/20/2003
PATENT APPLICATION: US/10/019,644 TIME: 15:28:10

Input Set : A:\SEQLIST(5854-6).TXT
Output Set: N:\CRF4\02202003\J019644.raw

156 tcccatcagt ggacaaatta gatgttcatc aaatattaca gggctgctat taacaagaga 7140
157 tggtggtaat agcaacaatg agtccgagat cttcagacct ggaggaggag atatgaggga 7200
158 caattggaga agtgaattat ataaatataa agtagtaaaa attgaaccat taggagtagc 7260
159 acccaccaag gcaaagagaa gagtggtgca gagagaaaaa agagcagtgg gaataggagc 7320
160 tttgttcctt gggttcttgg gagcagcagg aagcactatg ggcgcagcct caatgacgct 7380
161 gacggtacag gccagacaat tattgtctgg tatagtgcag cagcagaaca atttgctgag 7440
162 ggctattgag gcgcaacagc atctgttgca actcacagtc tggggcatca agcagctcca 7500
163 ggcaagaatc ctggctgtgg aaagatacct aaaggatcaa cagctcctgg ggatttgggg 7560
164 ttgctctgga aaactcattt gcaccactgc tgtgccttgg aatgctagtt ggagtaataa 7620
165 atctctggaa cagatttgga atcacacgac ctggatggag tgggacagag aaattaacaa 7680
166 ttacacaagc ttaatacact ccttaattga agaatcgcaa aaccagcaag aaaagaatga 7740
167 acaagaatta ttggaattag ataaatgggc aagtttgtgg aattggttta acataacaaa 7800
168 ttggctgtgg tatataaaat tattcataat gatagtagga ggcttggtag gtttaagaat 7860
169 agtttttgct gtactttcta tagtgaatag agttaggcag ggatattcac cattatcgtt 7920
170 tcagacccac ctcccaaccc cgaggggacc cgacaggccc gaaggaatag aagaagaagg 7980
171 tggagagaga gacagagaca gatccattcg attagtgaac ggatccttgg cacttatctg 8040
172 ggacgatctg cggagcctgt gcctcttcag ctaccaccgc ttgagagact tactcttgat 8100
173 tgtaacgagg attgtggaac ttctgggacg caggggtgg gaagccctca aatattggtg 8160
174 gaatctccta cagtattgga gtcaggaact aaagaatagt gctgttagct tgctcaatgc 8220
175 cacagccata gcagtagctg aggggacaga tagggttata gaagtagtac aaggagcttg 8280
176 tagagctatt cgccacatac ctagaagaat aagacagggc ttggaaagga ttttgctata 8340
177 agatgggtgg caagtggtca aaaagtagtg tgattggatg gcctactgta agggaaagaa 8400
178 tgagacgagc tgagccagca gcagataggg tgggagcagc atctcgagac ctggaaaaac 8460
179 atggagcaat cacaagtagc aatacagcag ctaccaatgc tgcttgtgcc tggctagaag 8520
180 cacaagagga ggaggaggtg ggttttccag tcacacctca ggtaccttta agaccaatga 8580
181 cttacaaggc agctgtagat cttagccact ttttaaaaga aaaggggga ctggaagggc 8640
182 taattcactc ccaaagaaga caagatatcc ttgatctgtg gatctaccac acacaaggct 8700
183 acttccctga ttagcagaac tacacaccag ggccaggggt cagatatcca ctgacctttg 8760
184 gatggtgcta caagctagta ccagttgagc cagataagat agaagaggcc aataaaggag 8820
185 agaacaccag cttgttacac cctgtgagcc tgcatgggat ggatgacccg gagagagaag 8880
186 tgttagagtg gaggtttgac agccgcctag catttcatca cgtggcccga gagctgcatc 8940
187 cggagtactt caagaactgc tgacatcgag cttgctacaa gggactttcc gctggggact 9000
188 ttccagggag gcgtggcctg ggcgggactg gggagtggcg agccctcaga tcctgcatat 9060
189 aagcagctgc tttttgcctg tactgggtct ctctggttag accagatctg agcctgggag 9120
190 ctctctggct aactagggaa cccactgctt aagcctcaat aaagcttgcc ttgagtgctt 9180
191 c 9181

193 <210> SEQ ID NO: 2
194 <211> LENGTH: 32
195 <212> TYPE: DNA
196 <213> ORGANISM: Artificial Sequence
198 <220> FEATURE:
199 <223> OTHER INFORMATION: oligonucleotide primer
201 <400> SEQUENCE: 2
202 ccggaattct ggctaactag ggaacccact gc 32

204 <210> SEQ ID NO: 3
205 <211> LENGTH: 33
206 <212> TYPE: DNA
207 <213> ORGANISM: Artificial Sequence
209 <220> FEATURE:

RAW SEQUENCE LISTING DATE: 02/20/2003
PATENT APPLICATION: **US/10/019,644** TIME: 15:28:10

Input Set : **A:\SEQLIST(5854-6).TXT**
Output Set: **N:\CRF4\02202003\J019644.raw**

210 <223> OTHER INFORMATION: oligonucleotide primer
212 <400> SEQUENCE: 3
213 cgcggatcct tattgtgacg aggggtcgct gcc 33
215 <210> SEQ ID NO: 4
216 <211> LENGTH: 20
217 <212> TYPE: DNA
218 <213> ORGANISM: Artificial Sequence
220 <220> FEATURE:
221 <223> OTHER INFORMATION: oligonucleotide primer
223 <400> SEQUENCE: 4
224 gacctccata gaagacaccg 20
226 <210> SEQ ID NO: 5
227 <211> LENGTH: 31
228 <212> TYPE: DNA
229 <213> ORGANISM: Artificial Sequence
231 <220> FEATURE:
232 <223> OTHER INFORMATION: oligonucleotide primer
234 <400> SEQUENCE: 5
235 ccggaattca tggagccagt agatcctaga c 31
237 <210> SEQ ID NO: 6
238 <211> LENGTH: 31
239 <212> TYPE: DNA
240 <213> ORGANISM: Artificial Sequence
242 <220> FEATURE:
243 <223> OTHER INFORMATION: oligonucleotide primer
245 <400> SEQUENCE: 6
246 cgcggatccg cagtgggttc cctagttagc c 31

VERIFICATION SUMMARY DATE: 02/20/2003
PATENT APPLICATION: **US/10/019,644** TIME: 15:28:11

Input Set : **A:\SEQLIST(5854-6).TXT**
Output Set: **N:\CRF4\02202003\J019644.raw**

L:14 M:270 C: Current Application Number differs, Replaced Current Application Number
L:15 M:271 C: Current Filing Date differs, Replaced Current Filing Date